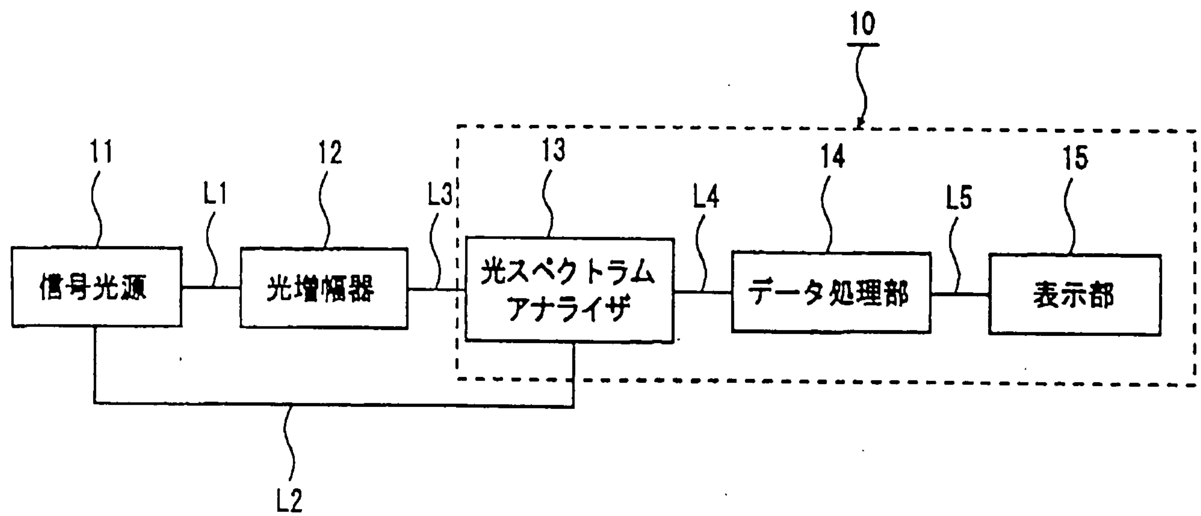
NOISE FIGURE-MEASURING DEVICE AND NOISE
URE-MEASURING METHOD
taro Ishihara et al.
10830-079001

Fig. 1




11 Signal light source
12 Optical amplifier
13 optical spectrum analyzer
14 Data processing portion
15 Displaying portion

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Gentaro [illegible]ihara et al.
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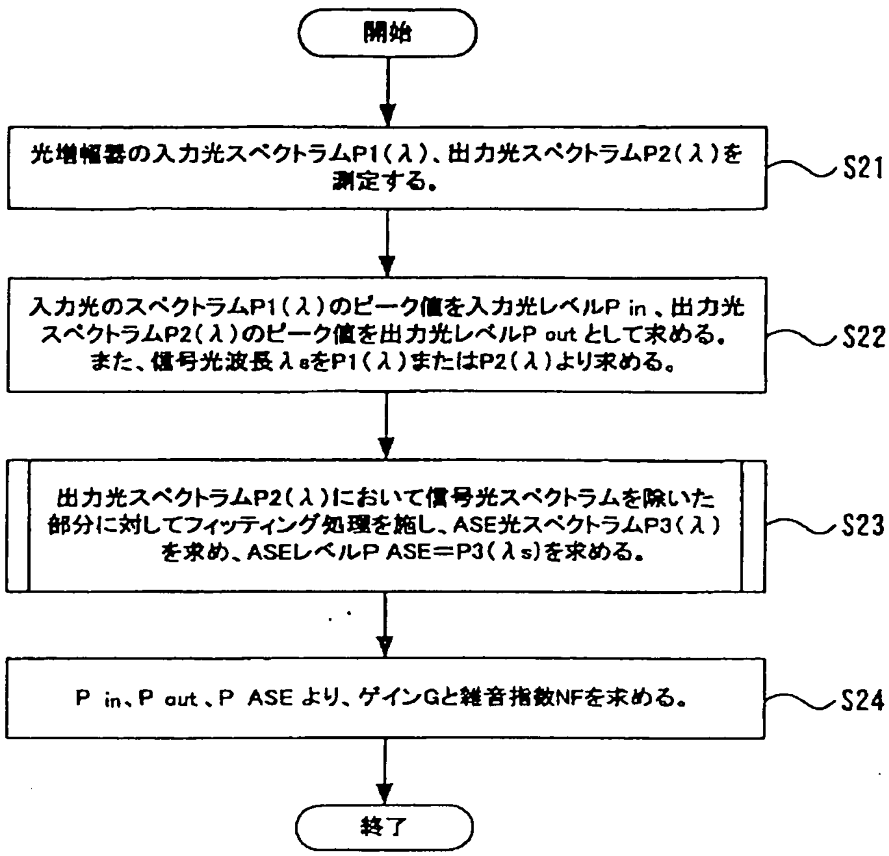
Fig. 2




S21: Measure input light spectrum $P1(\lambda)$ and output light spectrum $P2(\lambda)$.

S22: Calculate peak value of input light spectrum $P1(\lambda)$as an input light level Pin, and peak value of output light spectrum $P2(\lambda)$as an output light level Pout. Calculate signal light wavelength $\lambda_s$ based on $P1(\lambda)$ or $P2(\lambda)$.

S23: Perform fitting process for portion excluding signal light spectrum in terms of output light spectrum $P2(\lambda)$ data to prepare an ASE spectrum $P3(\lambda)$ to calculate ASE light level $P\ ASE = P3(\lambda_s)$

S24: Calculate gain G and noise figure NF based on Pin, Pout, and P ASE.

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Gentaro Ishihara et al.
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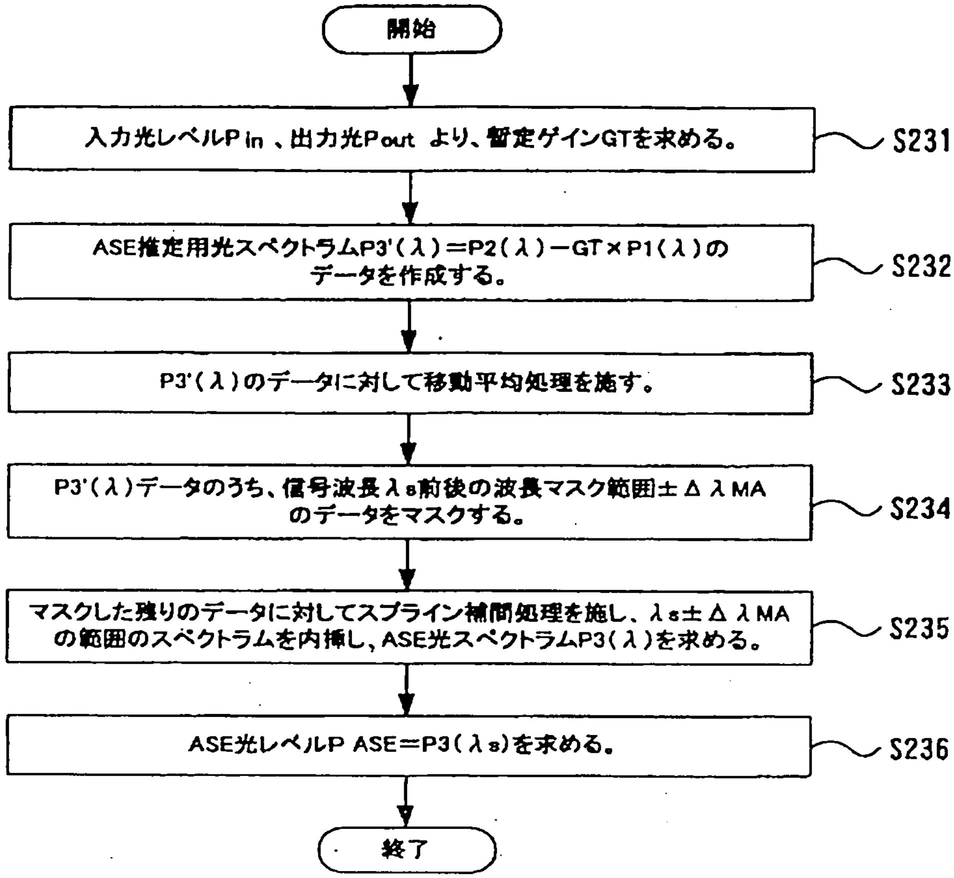
Fig. 3




S231: Calculate provisional gain GT based on input light level Pin and output light level Pout.
S232: Prepare data of light spectrum for assuming ASE $P3'(\lambda) = P2(\lambda) - GT \times P1(\lambda)$.
S233: Perform moving average process for the data of $P3'(\lambda)$.
S234: Mask data within a wavelength mask range of $\pm \Delta\lambda_{MA}$ of $P3'(\lambda)$ data before and after the signal wavelength $\lambda_s$
S235: Perform spline interpolation process for the remaining data after masking. Interporate spectrum within range of $\lambda_s \pm \Delta\lambda_{MA}$. Calculate ASE light spectrum $P3(\lambda)$.
S236: Calculate ASE light level $P\ ASE = P3(\lambda_s)$.

Fig. 4A

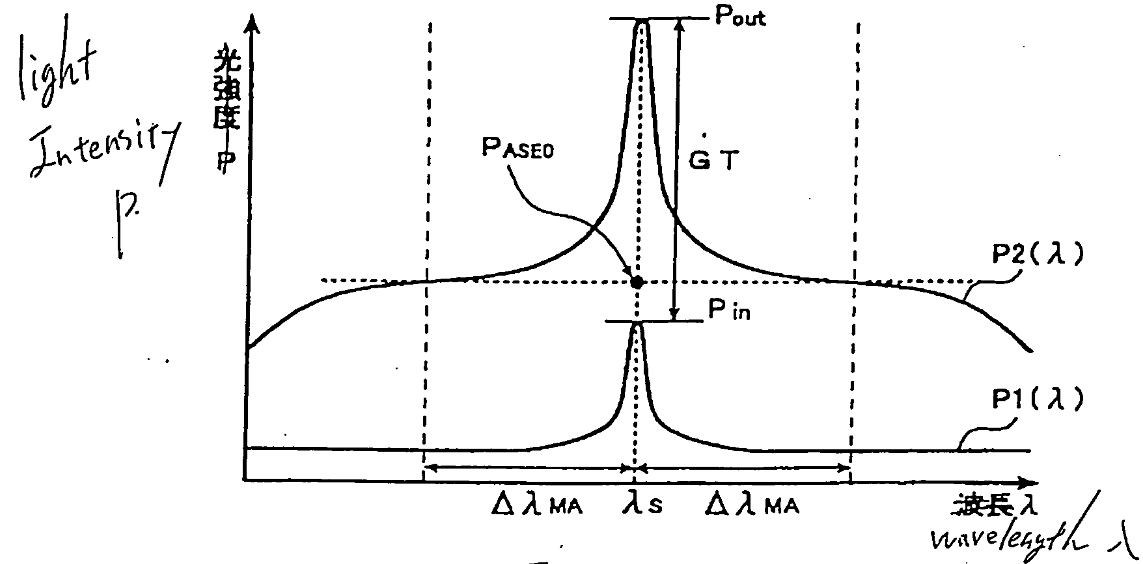

light Intensity P
光強度 P
Pout
GT
PASE0
P2(λ)
Pin
P1(λ)
Δλ MA
λs
Δλ MA
~~波長λ~~ wavelength λ

Fig. 4B

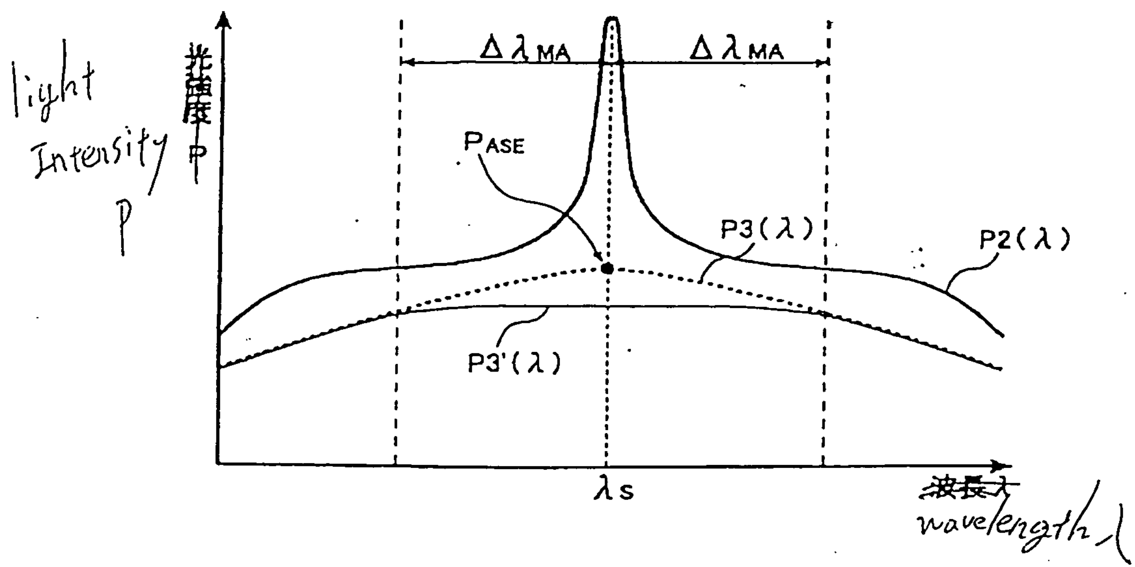
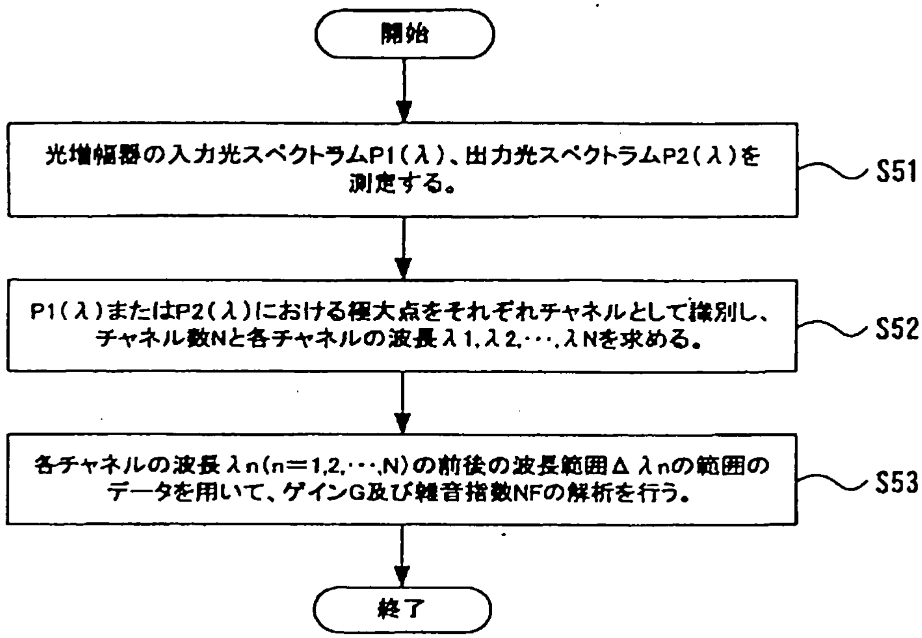

light Intensity P
光強度 P
Δλ MA
Δλ MA
PASE
P3(λ)
P2(λ)
P3'(λ)
λs
~~波長λ~~ wavelength λ

Fig. 5




S51: Measure input light spectrum P1(λ) and output light spectrum P2(λ) of optical amplifier.

S52 Recognize peak points in P1(λ) or P2(λ) as channels, respectively. Determine the number of channels and the wavelengths λ1, λ2, … λN of respective channels.

S53 Analyze gains G and noise figures NF by data within the range of Δλn before and after the wavelength λn (n= 1, 2, … N) of each channel.

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10830-079001

Fig. 6

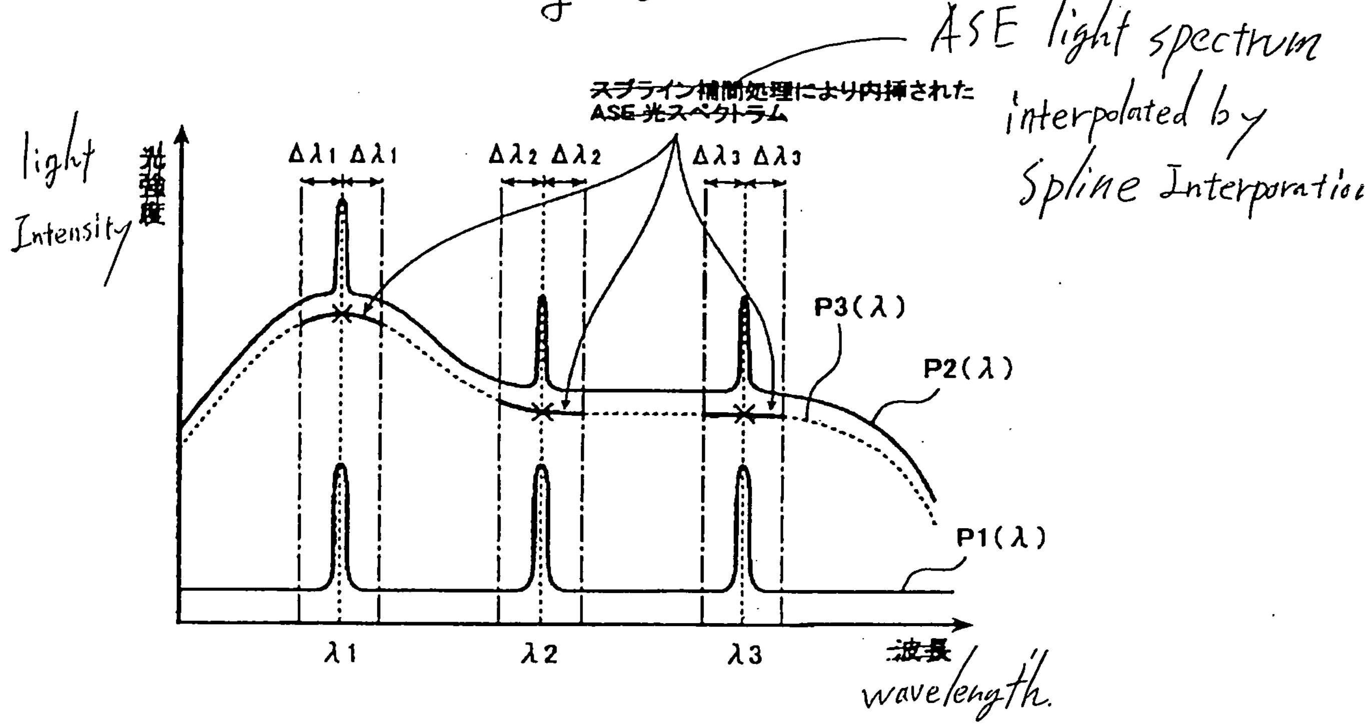

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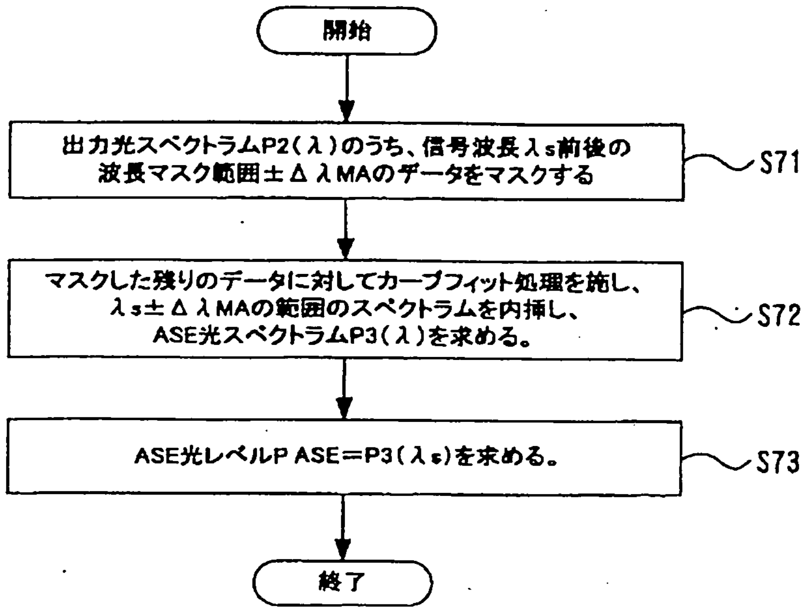
Fig. 7






S71: Of the output light spectrum $P2(\lambda)$, mask data within wavelength mask range of $\pm\Delta\lambda_{MA}$ before and after the signal wavelength $\lambda_s$.

S72: Perform curve-fit process for the remaining data after masking. Interpolate a spectrum within the range of $\lambda_s \pm \Delta\lambda_{MA}$ Determine ASE light spectrum $P3(\lambda)$.

S73 Determine ASE light level $P\ ASE = P3(\lambda_s)$.

NOISE FIGURE-MEASURING DEVICE AND NOISE FIGURE-MEASURING METHOD
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Fig. 8A

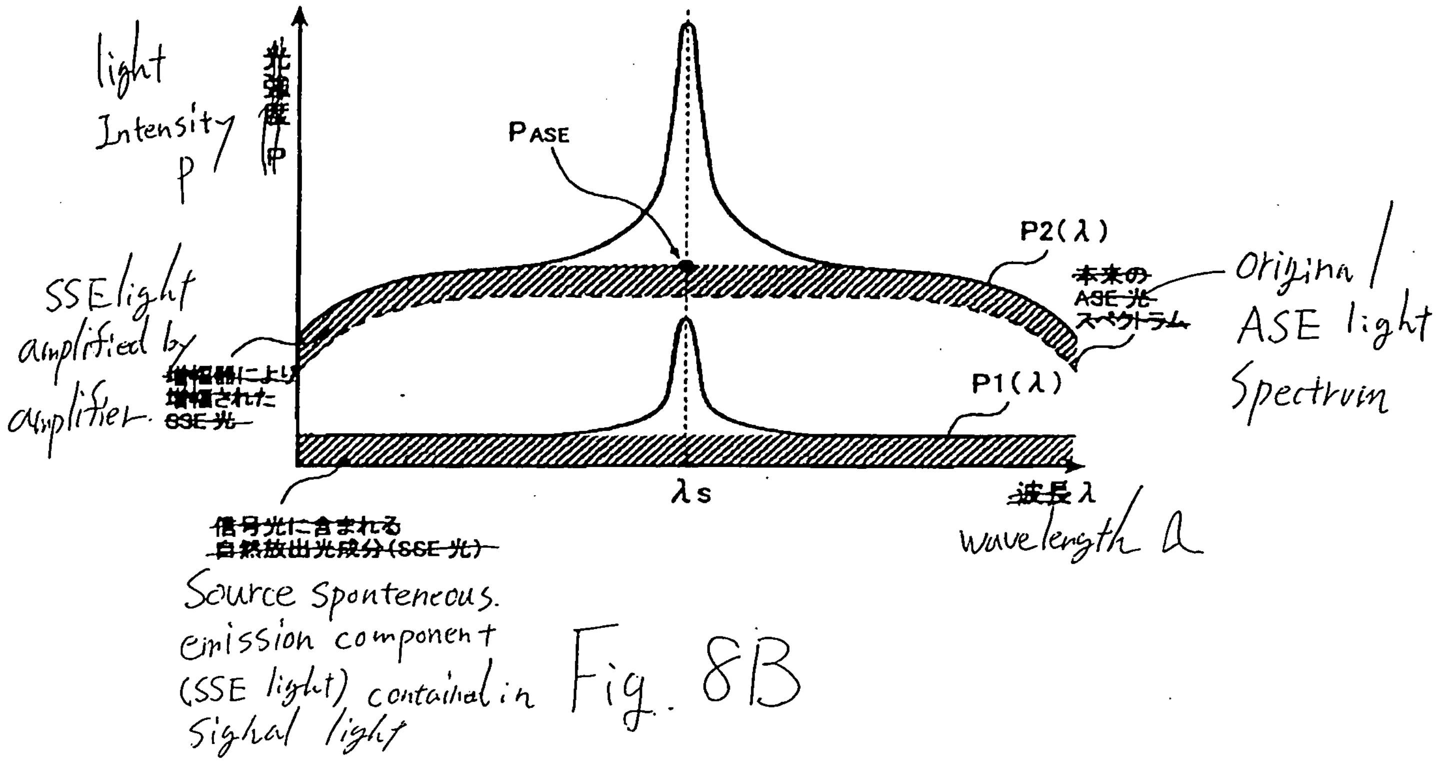


Fig. 8B